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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/986,636	11/09/2001	Ali Rusta-Sellehy	9351-86 HSF	5609

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CANADA

EXAMINER

KALAFUT, STEPHEN J

ART UNIT PAPER NUMBER

1745

DATE MAILED: 09/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n N .

09/986,636

Applicant(s)

RUSTA-SELLEHY ET AL.

Examiner

Stephen J. Kalafut

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☒ Claim(s) 9-24 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4,5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

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Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The terms "desired temperature" and "desired operating temperatures" in claim 4 are relative terms which renders the claim indefinite. The term "desired" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 and 3 are rejected under 35 U.S.C. 102(e) as being anticipated by Nakanishi *et al.* (US 6,592,741).

Nakanishi *et al.* disclose a fuel cell (1) and a chemical hydride hydrogen generating system (20) which supplies hydrogen to the fuel cell. A hydride is transferred from a storage device (21) into a reactor (23). Water is injected into the reactor (column 4, lines 34-38). Since the hydride may be an alkali borohydride (column 4, lines 38-45), the same type of hydride as presently disclosed, it would to some extent dissolve into the water. Thus, a chemical hydride solution is supplied to the reactor. The hydride then reacts to produce H₂, with the help of a catalyst (column 5, lines 17-26). The hydrogen is then consumed in the fuel cell. A coolant is

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circulated through the fuel cell and the reactor, thus transferring heat therebetween (column 5, lines 49-64). The heat transfer system also includes a heat exchanger (9), which dissipates heat from the coolant, thus controlling the temperature of the reactor.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakanishi *et al.* (US 6,592,741).

Nakanishi *et al.* teach that the coolant may be circulated from the reactor to the fuel cell (column 6, lines 18-22), and that the reactor may have a temperature higher than the fuel cell (column 5, lines 54-67). Nakanishi *et al.* also state that the fuel cell must be started, implying some kind of startup process (column 6, line 40). A fuel cell being started would be at room temperature, and thus in need of being heated. Because Nakanishi *et al.* teach that the reactor may be hotter than the fuel cell, it would be obvious to use heat from the reactor to heat the fuel cell on startup. Since Nakanishi *et al.* disclose target temperatures (column 5, line 63 through column 6, line 4), the optimization of the temperatures of the two components is also implicitly taught. Since both the fuel cell and the reactor produce heat, the heat exchanger (9) which is disposed along the coolant loop connected to them would be the obvious means to control their temperatures in order to practice this optimization.

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Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakanishi *et al.* (US 6,592,741) in view of Amendola *et al.* (WO 01/51410).

These claims differ from Nakanishi *et al.* by reciting a circuit between the hydride storage means and the reactor, and a pump along the circuit. Amendola *et al.* disclose a system for producing hydrogen (190) from a chemical hydride, which includes a storage zone (120), a reactor (180) including a catalyst (170), a pump (150), and conduits (160, 200) which together form a circuit. See figure 4 and page 23, lines 3-19. Because this allows for reactant recycle, and for rapid pressure-responsive control of the hydrogen generation (page 23, lines 13-19), it would be obvious to use the system disclosed by Amendola *et al.* as the hydrogen generator in the system of Nakanishi *et al.* Regarding claims 6 and 7, Nakanishi *et al.* discloses a heat exchanger (9), which would be a temperature control means for the heat transfer circuit which thermally connects the fuel cell and the hydrogen generator.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakanishi *et al.* (US 6,592,741) in view of Amendola *et al.* (WO 01/51410) as applied to claim 7 above, and further in view of Watkins *et al.* (US 5,200,278).

The above combination does not disclose a fan used to blow air through the heat exchanger. Watkins *et al.* disclose a heat exchange system (208) for a fuel cell, which system includes a heat exchanger (210) and two air circulation fans (222a, 222b), which are activated when a temperature of an oxidant stream or a thermocouple exceeds a predetermined value (column 9, lines 27-50). Because of the increased heat transfer afforded by airflow, and because

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the fans which provide airflow may be controlled, it would be obvious to use the fans of Watkins *et al.* to provide air to the heat exchanger of Nakanishi *et al.*, as modified by Amendola *et al.*

Claims 9-24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The use of an auxiliary heater is not taught by the prior art, for a fuel cell system which includes a hydrogen generation system which produces hydrogen from chemical hydrides. Such a reactor is exothermic, and may be hotter than the fuel cell, which would mean that these would not need any auxiliary heat.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Bossel (US 6,316,133), Stedman *et al.* (US 5,202,195) and Wu ("Hydrogen Storage...") disclose fuel cells which use hydrogen produced from metal hydrides.

The disclosure is objected to because of the following informalities: In figure 2, the numeral 14 is used to denote two different items. In figure 1, one of these is instead numbered as 24. Appropriate correction is required.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Kalafut whose telephone number is 703-308-0433. The examiner can normally be reached on Mon-Fri 8:00 am-4:30 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on 703-308-2383. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

sjk

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A handwritten signature in black ink, appearing to be 'M. H. Ryan', written over the stamp.